

claims 13-23 are added. Accordingly, claims 1-3, 5, and 7-23 are at issue in the above-identified application.

Claims 1-3, 5-6 and 8-12 were rejected under 35 U.S.C. 102(e) as being purportedly unpatentable over Arai, US Patent No. 5,952,779 ("Arai '779"). Claim 4 was rejected under 35 U.S.C. 103(a) as being purportedly unpatentable over Kawamura, US Patent No. 6,074,734, in view of Arai '779. Claim 7 was rejected under 35 U.S.C. 103(a) as being purportedly unpatentable over Arai '779 in view of Arai, US Patent No. 6,303,239 (Arai '239). Applicant respectfully traverses these rejections.

With regard to independent Claim 1, Applicants teach and claim a light-emitting device that comprises an anode, a cathode, and a layer that has an emission region, where the layer may be comprised of an organic or an inorganic material. Claim 1 as amended also recites the limitation that "said anode has a visible light transmittance of 35 to 75% and said anode having a metal selected from the group consisting of Ni, Ru, Ir, Rh, Pt, Pd, Re, Ti, Zr, Nb, Mo, and W." (Application, pg. 11 lines 5-16; pg. 34 line 13 - pg. 35 line 2; See also Pgs. 18-33, Examples 1-12 where the anode includes a layer of ITO and a layer of NiO; Pg. 38-39, Example 14 where the anode is comprised of RuO₂; pg. 46 Table 1). Applicants also teach and claim the light-emitting device has luminance in the range of 620 to 1200 cd m² and has a corresponding contrast in the range of 250:1 to 410:1 when the anode has a metal selected from the above-identified group of metals and has visible light transmittance of 35 to 75%. (Application, pgs. 18-33, Examples 1-13; pg. 46 Table 1; Fig. 6). In addition, Applicants teach and claim that light-emitting device has luminance in the range of 620 to 1200 cd m² and has corresponding contrast in is the range of

250:1 to 410:1 while the anode has a low work function in the range of 3.0 to 7.0 eV. (Application, pgs. 18-33, Examples 1-13; pg. 46 Table 1; pg. 46 line 1 - pg. 47 line 9; Fig. 6).

Arai '779 discloses a light-emitting device that has an anode, a light-emitting organic layer, and a cathode stacked on a transparent substrate where the anode has a light transmittance of 30 to 70%. Arai '779 teaches that the anode is comprised of tin-doped indium oxide (ITO), zinc-doped indium oxide (IZO), or tin-zinc-doped indium oxide (ITZO). In addition, Arai '779 further discloses that the anode is doped with iron (Fe) to achieve a light transmittance of 30 to 70%, luminance of 200 cd/m², and "some contrast improvement without recourse to any special antireflection coating film." (Arai '779, Abstract; Col. 2 lines 42-56; Col. 3 lines 5-37; Col. 8 lines 34-43; Col. 8 lines 64-67). Thus, Arai '779, alone or in combination with the other cited art, fails to teach the limitation that the anode has a metal selected from the group consisting of Ni, Ru, Ir, Rh, Pt, Pd, Fe, Ti, Zr, Nb, Mo, and W, which enables the light-emitting device to have substantial luminance with corresponding substantial contrast as taught and claimed by Applicants.

With respect to Claim 3, Applicants claim a light-emitting device that has the following limitation, among others: "wherein said anode comprises a first layer comprising a first compound selected from the group consisting of zinc, indium, and tin and a second layer comprising said metal." Applicants also teach and claim (See new Claims 15-16) that the second layer of said metal has a thickness in the range of 15 nm to 80 nm, where a luminance of the light-emitting device increases within the range of 620 to 1200 cd/m² as said thickness of said second layer is decreased within the identified range and a corresponding contrast of the light-emitting device increases within the range of 250:1 to 410:1 as the second layer thickness is

decreased within the range of 15 nm to 80 nm. (Application, pgs. 18-33, Examples 1-13; pg. 46 Table 1; Fig. 6).

Applicants submit that Arai '779, alone or in combination with the other cited art, fails to teach the limitation that the anode is comprised of at least two layers, the second of which has the selected metal selected from the above identified group and that has a thickness that enables the light-emitting device to have a corresponding substantial luminance and substantial contrast as taught and claimed by Applicants. Accordingly, Applicants request the Examiner to remove the rejection to Claim 3.

In addition, Claims 2-3, 5, and 7-12 depend from claim 1 and are thus should be allowable for the same reasons as Claim 1. Accordingly, Applicant respectfully requests that the Examiner withdraw the rejection to these claims.

Finally, Applicants respectfully request consideration of newly added dependent claims 13-23 that further distinguish applicants invention. In particular, Claims 13-14 recite limitations to a dopant or dopant material that may be added to the anode of the claimed light-emitting device so as to further improve the luminance and the contrast, among other characteristics, of the light-emitting device. (Application, pgs. 11 line 21 - pg. 12 line 6; pgs. 35-38, Examples 14-16; pgs. 41-43 Examples 19-20; pg. 46 Table 1). Claims 15-16 recite limitations for the thickness of the second layer of the anode as defined in Claim 3. (Application, pgs. 18-33, Examples 1-13; pg. 46 Table 1; Fig. 6). Claims 17-23 recite limitations for a claimed light-emitting device where the layer having the emission region is an inorganic layer. (Application, pgs. 43-45, Examples 21-22; pg. 46 Table 1; pg. 47 lines 10-15).

CONCLUSION

In view of the above amendments and remarks, Applicants submit that all claims are clearly allowable over the cited prior art, and respectfully request early and favorable notification to that effect. If the Examiner believes that a conference would be of value in expediting the prosecution of this application, the Examiner is invited to telephone the undersigned counsel to arrange such a conference.

Respectfully submitted,

Dated: April 12, 2002

By: 

Thomas J. Burton
Registration No. 47,464
SONNENSCHN NATH & ROSENTHAL
P.O. Box 061080
Wacker Drive Station, Sears Tower
Chicago, Illinois 60606-1080
(312) 876-8000

APPENDIX A

VERSION WITH MARKINGS TO SHOW CHANGES MADE IN CLAIMS

Please cancel Claims 4 and 6 without prejudice.

Claims 1, 3, 5, and 8 are amended and Claims 13-23 are added as follows:

1. (Amended) A light-emitting device comprising a layer including an emission region and provided between an anode and a cathode wherein said anode has a visible light transmittance of 35 to 75%, said anode having a metal selected from the group consisting of Ni, Ru, Ir, Rh, Pt, Pd, Re, Ti, Zr, Nb, Mo, and W.

3. (Amended) A light-emitting device according to Claim 1, wherein said anode comprises [at least one member selected from the group consisting of metals of groups, IIIA, IVA, VA, VIA, VIIA, VIIIA and IB of the periodic table, and compounds thereof]a first layer comprising a first compound selected from the group consisting of zinc, indium, and tin and a second layer comprising said metal.

5. (Amended) A light-emitting device according to Claim 3, wherein said [at least one member consists of a metal]second layer comprises a metal compound having said metal and a material selected from the group consisting of oxides, nitrides and oxide-nitrides.

8. (Amended) A light-emitting device according to Claim 1, wherein said device comprises, on a transparent substrate, a built-up body including said anode, an organic [or inorganic] layer containing said emission region and said cathode.

13. (New) A light-emitting device according to Claim 1, where said anode has a dopant selected from the group consisting of H, Li, Na, K, Rb, Cs, Cu, Ag, and Au.

14. (New) A light-emitting device according to Claim 1, where said anode has a dopant material selected from the group consisting of R_xNiO , R_xWO_3 , and $TiNb_xO_y$, wherein R is selected from the group consisting of H, Li, Na, K, Rb, Cs, Cu, Ag, and Au.

15. (New) A light-emitting device according to Claim 3, where said second layer has a thickness in the range of 15 nm to 80 nm.

16. (New) A light-emitting device according to Claim 15, where said light-emitting device has a luminance that increases within the range of 620 to 1200 cd/m² as said thickness of said second layer is decreased within the range of 15 nm to 80 nm and has a contrast corresponding to said luminance that increases within the range of 250:1 to 410:1 as said thickness of said second layer is decreased within the range of 15 nm to 80 nm.

17. (New) A light-emitting device comprising an inorganic layer including an emission region and provided between an anode and a cathode wherein said anode has a visible light transmittance of 35 to 75%.

18. (New) A light-emitting device according to Claim 17, wherein the visible light has a wavelength ranging from 380 nm to 780 nm.

19. (New) A light-emitting device according to Claim 17, wherein said anode comprises a metal selected from the group consisting of Ni, Ru, Ir, Rh, Pt, Pd, Re, Ti, Zr, Nb, Mo, and W.

20. (New) A light-emitting device according to Claim 19, wherein said anode comprises a metal compound having said metal and a material selected from the group consisting of oxides, nitrides and oxide-nitrides.

21. (New) A light-emitting device according to Claim 19, wherein said anode comprises a plurality of layers, a first of the layers having a material selected from the group consisting of zinc, indium or tin, a second of the layers having said metal.

22. (New) A light-emitting device according to Claim 19, wherein said anode has a dopant selected from the group consisting of H, Li, Na, K, Rb, Cs, Cu, Ag and Au.

23. (New) A light-emitting device according to Claim 17, wherein said anode has a work function of 3.0 to 7.0 eV.